



US008372044B2

(12) **United States Patent**
Westbye et al.

(10) **Patent No.:** **US 8,372,044 B2**
(45) **Date of Patent:** ***Feb. 12, 2013**

(54) **SYRINGE WITH NEEDLE GUARD**
INJECTION DEVICE

(75) Inventors: **Lars Tommy Westbye**, Carlsbad, CA (US); **Philip Dowds**, San Diego, CA (US)

(73) Assignee: **Safety Syringes, Inc.**, Carlsbad, CA (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 775 days.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: **11/133,634**

(22) Filed: **May 20, 2005**

(65) **Prior Publication Data**

US 2006/0264825 A1 Nov. 23, 2006

(51) **Int. Cl.**
A61M 5/32 (2006.01)
A61M 5/00 (2006.01)

(52) **U.S. Cl.** **604/198**; 128/919; 604/110; 604/192; 604/197; 604/263

(58) **Field of Classification Search** 604/192, 604/198, 210, 110, 181, 187, 218, 197, 227, 604/263; 128/919, 917

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

827,383 A 7/1906 McElroy et al.
1,652,894 A 12/1927 Gunther
1,921,034 A 8/1933 Lamarche
2,432,605 A 12/1947 Barach
2,571,653 A 10/1951 Bastien

2,586,581 A 2/1952 Tschischeck
2,895,474 A 7/1959 Reznek
2,925,083 A 2/1960 Craig
3,046,985 A 7/1962 Saenz
3,306,290 A 2/1967 Weltman

(Continued)

FOREIGN PATENT DOCUMENTS

EP 0 405 039 A1 1/1991
EP 0467173 A 1/1992

(Continued)

OTHER PUBLICATIONS

U.S. Patent and Trademark Office, Official Gazette, vol. 1223, No. 2, pp. 818, 819, and 820, dated Jun. 8, 1999.

(Continued)

Primary Examiner — Kevin C Sirmons

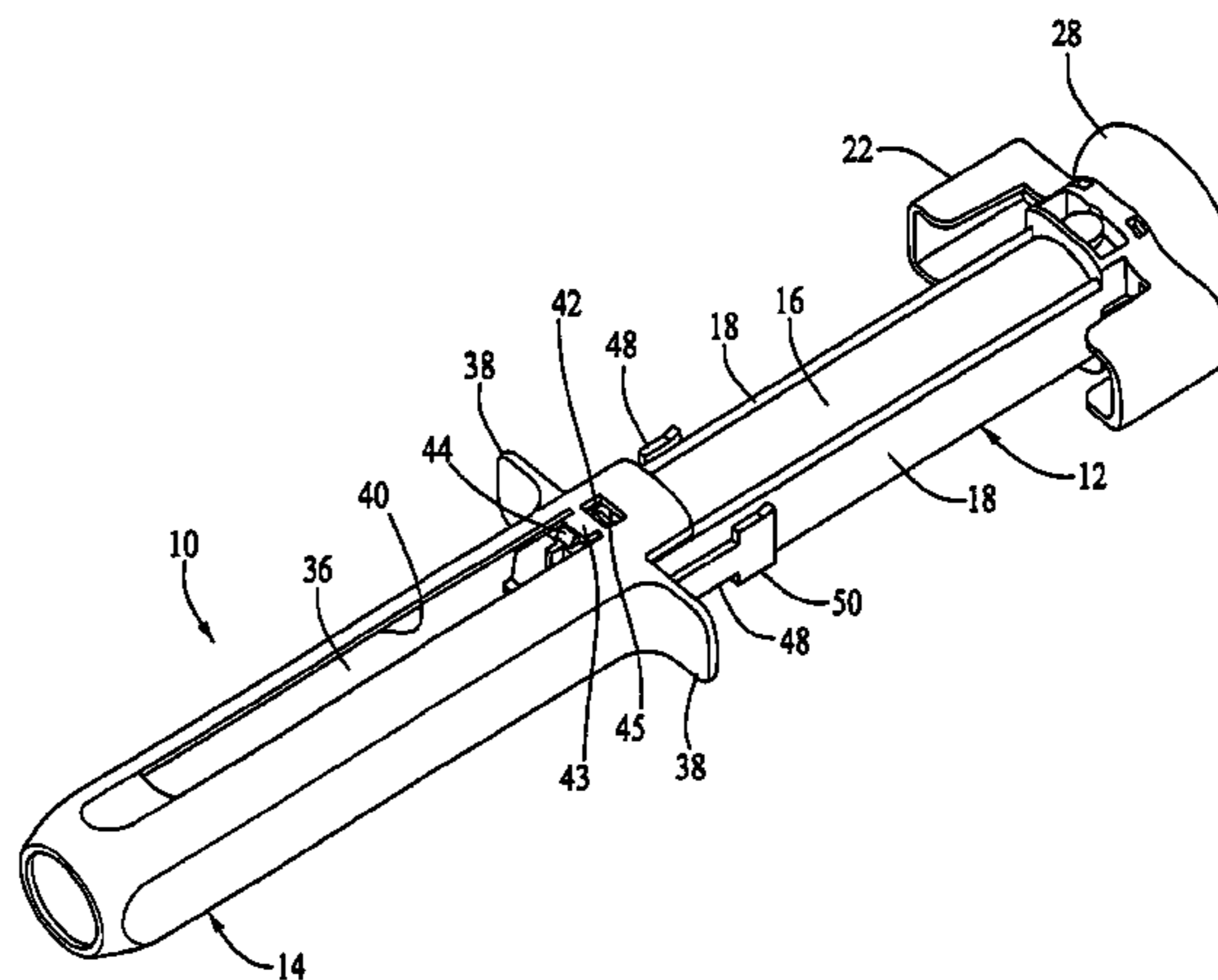
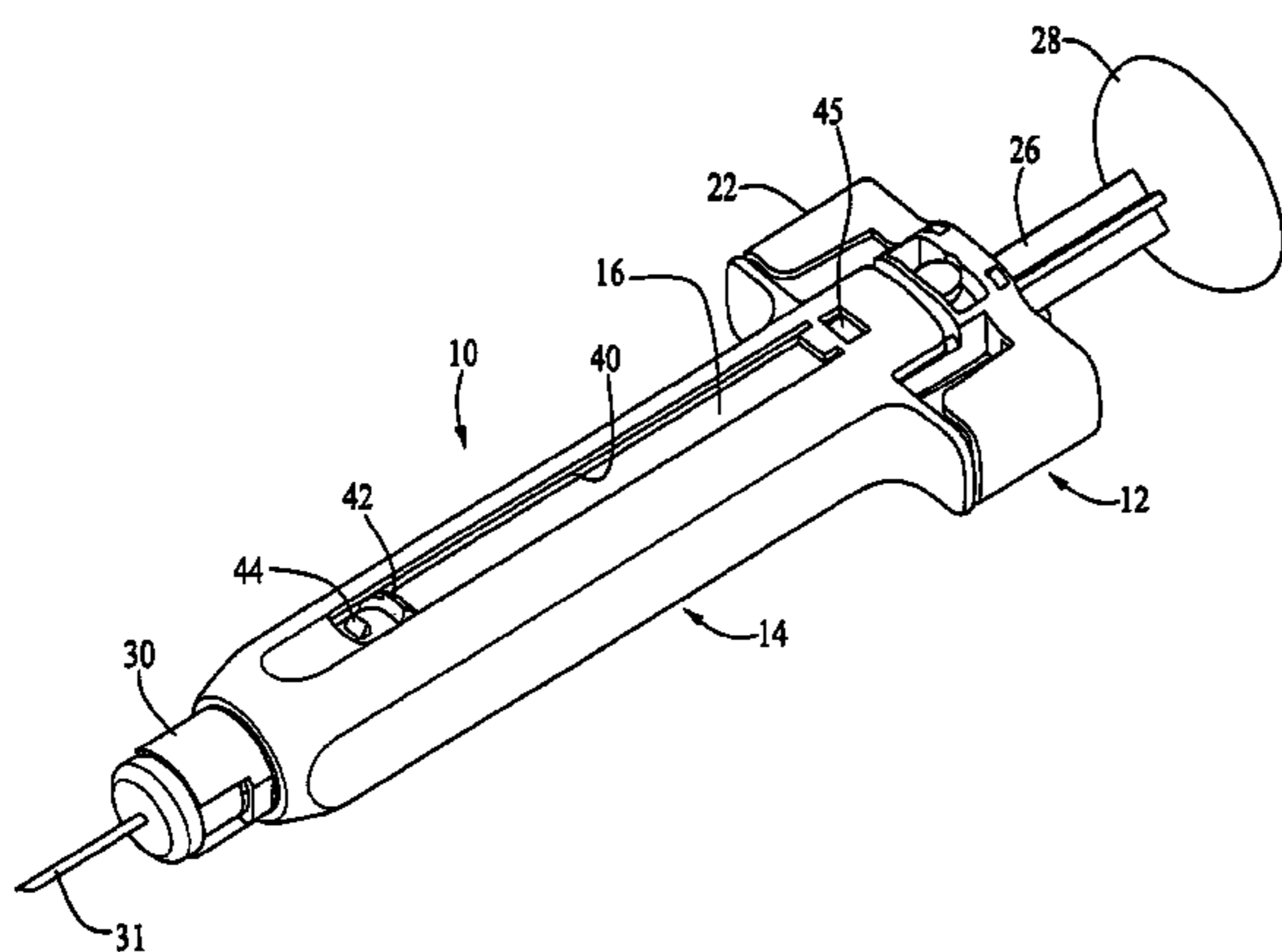
Assistant Examiner — Shefali Patel

(74) *Attorney, Agent, or Firm* — Dickstein Shapiro LLP; Kenneth S. Roberts

(57) **ABSTRACT**

The present invention provides an injection device including a syringe having a distal end for receiving a needle, and a plunger inserted into a proximal end. A guard is slidable on the syringe, has a proximal end, a distal end, and is biased from a first position wherein the needle is exposed toward a second position wherein the guard covers the needle. The syringe includes a body having a central cylindrical opening for receiving a medicine and the plunger, and further includes a pair of longitudinally extending members on opposite sides of the body. The injection device includes cooperating detents for retaining the guard and syringe in the first and second positions. A latch member is engageable by the plunger as the plunger is depressed to release the cooperating detents. Upon release, a spring element biases the guard toward the second position.

9 Claims, 4 Drawing Sheets



US 8,372,044 B2

U.S. PATENT DOCUMENTS

U.S. PATENT DOCUMENTS			5,059,184 A	10/1991 Dyke
3,583,230 A	6/1971 Patterson		5,059,185 A	10/1991 Ryan
3,583,399 A	6/1971 Ritsky		5,067,490 A	11/1991 Haber
3,878,846 A	4/1975 Rimbaud		5,067,945 A	11/1991 Ryan et al.
3,885,562 A	5/1975 Lampkin		5,069,225 A	12/1991 Okamura
3,930,499 A	1/1976 Rimbaud		5,070,884 A	12/1991 Columbus et al.
3,943,927 A	3/1976 Norgren		5,070,885 A	12/1991 Bonaldo
3,973,554 A	8/1976 Tipton		5,085,639 A	2/1992 Ryan
4,018,223 A	4/1977 Ethington		5,086,780 A	2/1992 Schmitt
4,022,207 A	5/1977 Citrin		5,086,982 A	2/1992 Ryan
4,048,997 A	9/1977 Raghavachari et al.		5,088,982 A	2/1992 Ryan
4,171,699 A	10/1979 Jones et al.		5,088,986 A	2/1992 Nusbaum
4,333,456 A	6/1982 Webb		5,088,988 A	2/1992 Talonn et al.
4,333,457 A	6/1982 Margulies		5,098,382 A	3/1992 Haber et al.
4,356,822 A	11/1982 Winstead-Hall		5,100,427 A	3/1992 Crossman et al.
4,381,779 A	5/1983 Margulies		5,100,428 A	3/1992 Mumford
4,425,120 A	1/1984 Sampson et al.		5,104,380 A	4/1992 Holman et al.
4,425,230 A	1/1984 Andress et al.		5,104,386 A	4/1992 Alzain
4,540,405 A	9/1985 Miller et al.		5,106,379 A	4/1992 Leap
4,573,976 A	3/1986 Sampson et al.		5,108,376 A	4/1992 Bonaldo
4,592,744 A	6/1986 Jagger et al.		5,108,378 A	4/1992 Firth et al.
4,601,711 A	7/1986 Ashbury et al.		5,112,307 A	5/1992 Haber et al.
4,631,057 A	12/1986 Mitchell		5,116,319 A	5/1992 Van Den Haak
4,643,199 A	2/1987 Jennings, Jr. et al.		5,120,311 A	6/1992 Sagstetter et al.
4,655,751 A	4/1987 Harbaugh		5,131,405 A	7/1992 Burns
4,681,567 A	7/1987 Masters et al.		5,137,521 A	8/1992 Wilkins
4,690,676 A	9/1987 Moulding, Jr. et al.		5,141,500 A	8/1992 Hake
4,702,738 A	10/1987 Spencer		5,147,326 A	9/1992 Talonn et al.
4,723,943 A	2/1988 Spencer		5,154,699 A	10/1992 Ryan
4,728,321 A	3/1988 Chen		5,163,917 A	11/1992 Huefner et al.
4,737,144 A	4/1988 Choksi		5,176,656 A	1/1993 Bayless
4,738,663 A	4/1988 Bogan		5,176,657 A	1/1993 Shields
4,743,234 A	5/1988 Leopoldi et al.		5,201,708 A	4/1993 Martin
4,747,831 A	5/1988 Kulli		5,201,720 A	4/1993 Borgia et al.
4,762,516 A	8/1988 Luther et al.		5,207,646 A	5/1993 Brunel
4,767,413 A	8/1988 Haber et al.		5,215,535 A	6/1993 Gettig et al.
4,772,272 A	9/1988 McFarland		5,219,339 A	6/1993 Saito
4,795,443 A	1/1989 Permenter et al.		5,242,416 A	9/1993 Hutson
4,801,295 A	1/1989 Spencer		5,242,420 A	9/1993 Martin
4,813,426 A	3/1989 Haber et al.		5,246,011 A	9/1993 Caillouette
4,820,275 A	4/1989 Haber et al.		5,259,841 A	11/1993 Hohendorfer et al.
4,832,696 A	5/1989 Luther et al.		5,266,072 A	11/1993 Utterberg et al.
4,840,185 A	6/1989 Hernandez		5,269,766 A	12/1993 Haber et al.
4,850,961 A	7/1989 Wanderer et al.		5,273,541 A	12/1993 Malenchek
4,850,994 A	7/1989 Zerbst et al.		5,279,581 A	1/1994 Firth et al.
4,869,249 A	9/1989 Crossman et al.		5,300,030 A	4/1994 Crossman et al.
4,871,355 A	10/1989 Kikkawa		5,328,485 A	7/1994 Moreno et al.
4,874,384 A	10/1989 Nunez		5,330,438 A	7/1994 Gollobin et al.
4,878,902 A	11/1989 Wanderer et al.		5,336,185 A	8/1994 Lynch et al.
4,892,523 A	1/1990 Haber et al.		5,342,320 A	8/1994 Cameron
4,898,590 A	2/1990 Andors		5,344,407 A	9/1994 Ryan
4,900,310 A	2/1990 Ogle, II		5,372,590 A	12/1994 Haber
4,911,693 A	3/1990 Paris		5,385,557 A	1/1995 Thompson
4,915,701 A	4/1990 Halkyard		5,407,431 A	4/1995 Botich et al.
4,915,702 A	4/1990 Haber		5,417,660 A	5/1995 Martin
4,917,669 A	4/1990 Bonaldo		5,433,712 A	7/1995 Stiles et al.
4,917,673 A	4/1990 Coplin		5,437,639 A	8/1995 Malenchek
4,923,445 A	5/1990 Ryan		5,437,647 A *	8/1995 Firth et al. 604/110
4,923,447 A	5/1990 Morgan		5,445,620 A	8/1995 Haber et al.
4,927,416 A	5/1990 Tomkiel		5,492,536 A	2/1996 Mascia
4,932,947 A	6/1990 Cardwell		5,496,286 A	3/1996 Stiehl et al.
4,935,016 A	6/1990 Delco		5,498,244 A	3/1996 Eck
4,938,745 A	7/1990 Sagstetter		5,501,672 A	3/1996 Firth et al.
4,946,446 A	8/1990 Vadher		5,514,107 A	5/1996 Haber et al.
4,946,447 A	8/1990 Hardcastle et al.		5,522,812 A	6/1996 Talonn
4,955,868 A	9/1990 Klein		5,531,706 A	7/1996 De la Fuente
4,957,490 A	9/1990 Byrne et al.		5,554,122 A	9/1996 Emanuel
4,969,877 A	11/1990 Kornberg		5,562,624 A *	10/1996 Righi et al. 604/110
4,974,603 A	12/1990 Jacobs		5,562,626 A	10/1996 Sanpietro
4,990,141 A	2/1991 Byrne et al.		5,569,211 A	10/1996 Lekhgolts et al.
5,000,744 A	3/1991 Hoffman et al.		5,571,089 A	11/1996 Crocker
5,002,537 A	3/1991 Hoffman et al.		5,573,508 A	11/1996 Thornton
5,007,903 A	4/1991 Ellard		5,573,512 A	11/1996 van den Haak
5,013,301 A	5/1991 Marotta, Jr. et al.		5,573,513 A	11/1996 Wozencroft
5,013,305 A	5/1991 Opie et al.		5,575,771 A	11/1996 Walinsky
5,030,209 A	7/1991 Wanderer et al.		5,599,309 A	2/1997 Marshall et al.
5,033,650 A	7/1991 Colin et al.		5,611,783 A	3/1997 Mikkelsen
5,045,066 A	9/1991 Scheuble et al.		5,611,809 A	3/1997 Marshall et al.
5,057,087 A	10/1991 Harmon		5,616,134 A	4/1997 Firth et al.

US 8,372,044 B2

Page 3

5,624,400	A	4/1997	Firth et al.	
5,643,214	A	7/1997	Marshall et al.	
5,674,203	A	10/1997	Lewandowski	
5,695,475	A	12/1997	Best, Jr. et al.	
5,709,663	A	1/1998	Younkes	
5,716,340	A	2/1998	Schweich, Jr. et al.	
5,762,635	A	6/1998	Pace et al.	
5,855,839	A	1/1999	Brunel	
5,928,205	A	7/1999	Marshall	
5,980,487	A	11/1999	Jones et al.	
5,989,226	A	11/1999	Hymanson	
6,004,296	A	12/1999	Jansen et al.	
6,015,402	A	1/2000	Sahota	
6,017,330	A	1/2000	Hitchins et al.	
6,030,366	A	2/2000	Mitchell	
6,077,247	A	6/2000	Marshall et al.	
6,086,568	A	7/2000	Caizza	
6,102,893	A *	8/2000	Aneas	604/110
6,159,181	A	12/2000	Crossman et al.	
6,159,184	A	12/2000	Perez et al.	
6,171,283	B1 *	1/2001	Perez et al.	604/192
6,186,980	B1	2/2001	Brunel	
6,193,695	B1	2/2001	Rippstein, Jr.	
6,203,530	B1	3/2001	Stewart	
6,206,853	B1	3/2001	Bonnet	
RE37,439	E	11/2001	Firth et al.	
6,319,233	B1	11/2001	Jansen et al.	
6,319,234	B1	11/2001	Restelli et al.	
6,344,032	B1	2/2002	Perez et al.	
6,416,323	B1	7/2002	Grenfell et al.	
6,425,880	B1	7/2002	Marshall	
6,461,333	B1	10/2002	Frezza	
4,923,477	A1	2/2003	Hansen	
6,550,967	B2	4/2003	Hedaya	
6,613,022	B1	9/2003	Doyle	
6,623,459	B1	9/2003	Doyle	
6,719,730	B2	4/2004	Jansen et al.	
6,719,736	B2	4/2004	Collins et al.	
6,752,798	B2	6/2004	McWethy et al.	
6,846,302	B2 *	1/2005	Shemesh et al.	604/110
6,976,976	B2 *	12/2005	Doyle	604/198
2001/0005781	A1	6/2001	Amark	
2002/0032412	A1	3/2002	Riemelmoser	
2002/0045864	A1	4/2002	Perez et al.	
2002/0169421	A1	11/2002	McWethy et al.	
2002/0193746	A1	12/2002	Chevallier	
2003/0069545	A1	10/2003	Doyle	
2003/0187402	A1 *	10/2003	Doyle	604/198

FOREIGN PATENT DOCUMENTS

EP	0 555974	A1	8/1993
EP	0 680 767	A1	11/1995
EP	0 740 942	A1	11/1996
EP	0 864 335	A2	9/1998
EP	0 940 153	A1	9/1999
EP	0 966 983	A1	12/1999
EP	1371382	A	12/2003
EP	1284769	B1	11/2005
FR	2 654 346	A1	5/1991
FR	2 782 011	A1	8/1998
FR	2 764 195	A1	12/1998
FR	2 788 984	A1	1/1999
FR	2 788 985	A1	7/1999
FR	2 778 853	A1	11/1999
FR	2 799 976	A1	4/2001

FR	2 801 795	A1	6/2001
GB	2 283 425	A	5/1995
WO	WO 88/02297	A1	4/1988
WO	WO 91/18634	A1	12/1991
WO	WO 93/00949	A1	1/1993
WO	WO 93/17732	A2	9/1993
WO	WO 95/04565	A1	2/1995
WO	WO 98/35714	A1	8/1998
WO	WO 99/16489	A1	4/1999
WO	WO 99/17823	A1	4/1999
WO	WO 99/32177	A1	7/1999
WO	WO 99/37343	A1	7/1999
WO	WO 99/37345	A1	7/1999
WO	WO 99/56805		11/1999
WO	WO 00/76565	A1	1/2000
WO	WO 00/33900	A1	6/2001
WO	WO 01/41841	A2	6/2001
WO	WO 01/80931	A2	11/2001
WO	WO 01/85239	A	11/2001
WO	WO 01/85239	A2	11/2001
WO	WO 03/013632	A2	2/2003
WO	WO 03/082385	A	10/2003
WO	WO 03/082386	A	10/2003
WO	WO 2006/050304	A	11/2006

OTHER PUBLICATIONS

U.S. Patent and Trademark Office, Official Gazette, vol. 1223, No. 4, pp. 2156, 2157, and 2575, dated Jun. 22, 1999.

U.S. Patent and Trademark Office, Official Gazette, vol. 1224, No. 1, pp. 303, 305, and 306 dated Jul. 6, 1999.

U.S. Patent and Trademark Office, Official Gazette, vol. 1224, No. 4, p. 3115 and 3404, dated Jul. 27, 1999.

U.S. Patent and Trademark Office, Official Gazette, vol. 1232, No. 1, pp. 381, 382, 384, 385, 386, and 387, dated Mar. 7, 2000.

U.S. Patent and Trademark Office, Official Gazette, vol. 1232, No. 2, pp. 1507, 1508, and 1509, dated Mar. 14, 2000.

U.S. Patent and Trademark Office, Official Gazette, vol. 1232, No. 3, p. 2532, dated Mar. 21, 2000 Book 2 of 2 Books.

U.S. Patent and Trademark Office, Official Gazette, vol. 1232, No. 4, p. 3505, dated Mar. 28, 2000.

U.S. Patent and Trademark Office, Official Gazette, vol. 1234, No. 4, pp. 3543 and 3829, May 23, 2000.

U.S. Patent and Trademark Office, Official Gazette, vol. 1235, No. 2, pp. 1234, 1443, and 1444, dated Jun. 13, 2000.

U.S. Patent and Trademark Office, Official Gazette, vol. 1235, No. 3, pp. 2456 and 2457, dated Jun. 20, 2000.

U.S. Patent and Trademark Office, Official Gazette, vol. 1236, No. 1, p. 443, dated Jul. 4, 2000.

U.S. Patent and Trademark Office, Official Gazette, vol. 1236, No. 2, pp. 1625 and 1626, dated Jul. 11, 2000.

U.S. Patent and Trademark Office, Official Gazette, vol. 1236, No. 3, pp. 2873 and 2874, dated Jul. 18, 2000.

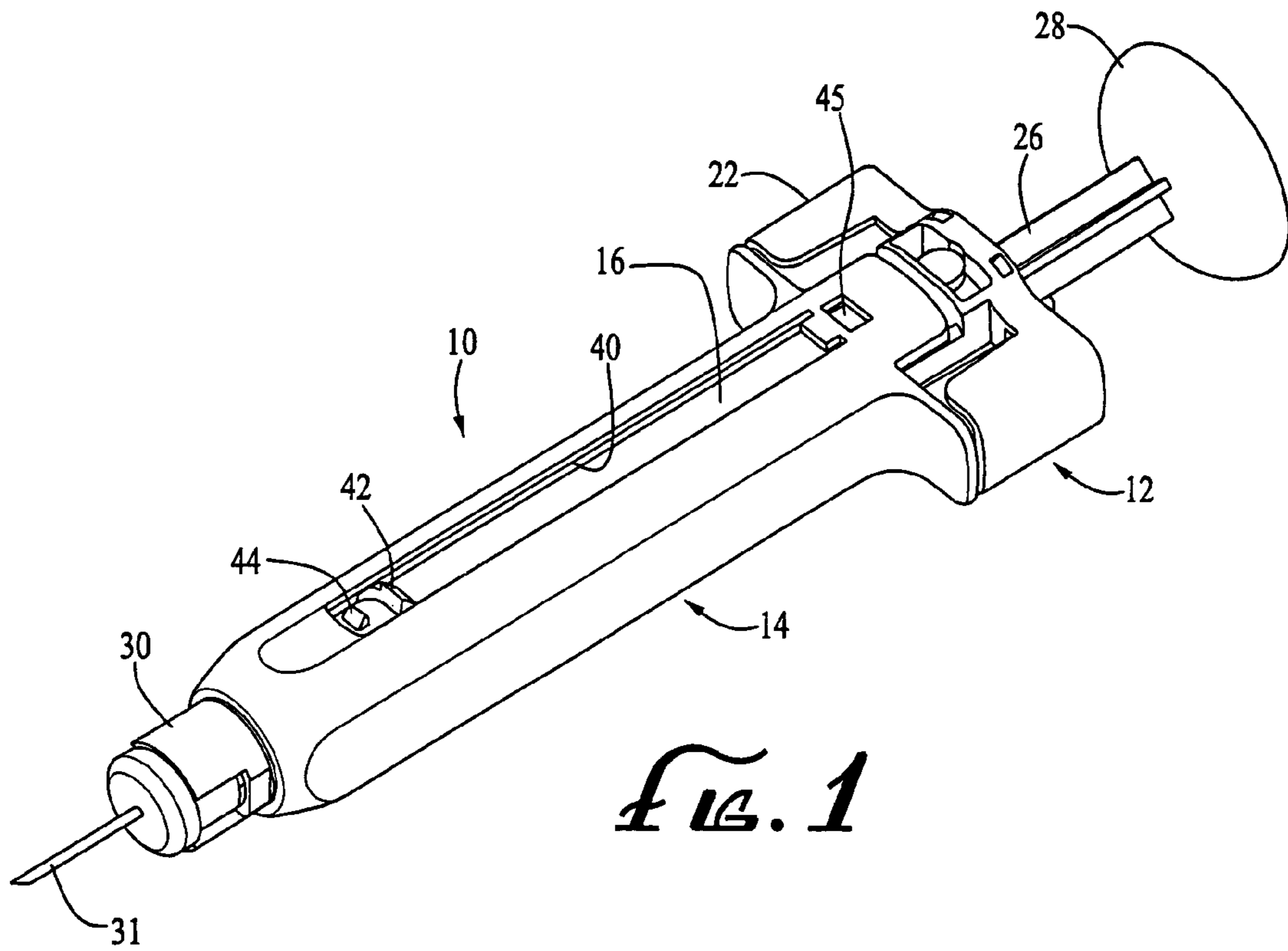
U.S. Patent and Trademark Office, Official Gazette, vol. 1236, No. 4, pp. 3963 and 3964, dated Jul. 25, 2000.

U.S. Patent and Trademark Office, Official Gazette, vol. 1237, No. 1, pp. 435 and 436, dated Aug. 1, 2000.

U.S. Patent and Trademark Office, Official Gazette, vol. 1237, No. 2, pp. 1669 and 1670, dated Aug. 8, 2000.

U.S. Patent and Trademark Office, Official Gazette, vol. 1237, No. 3, pp. 2845 and 2846, dated Aug. 15, 2000.

* cited by examiner



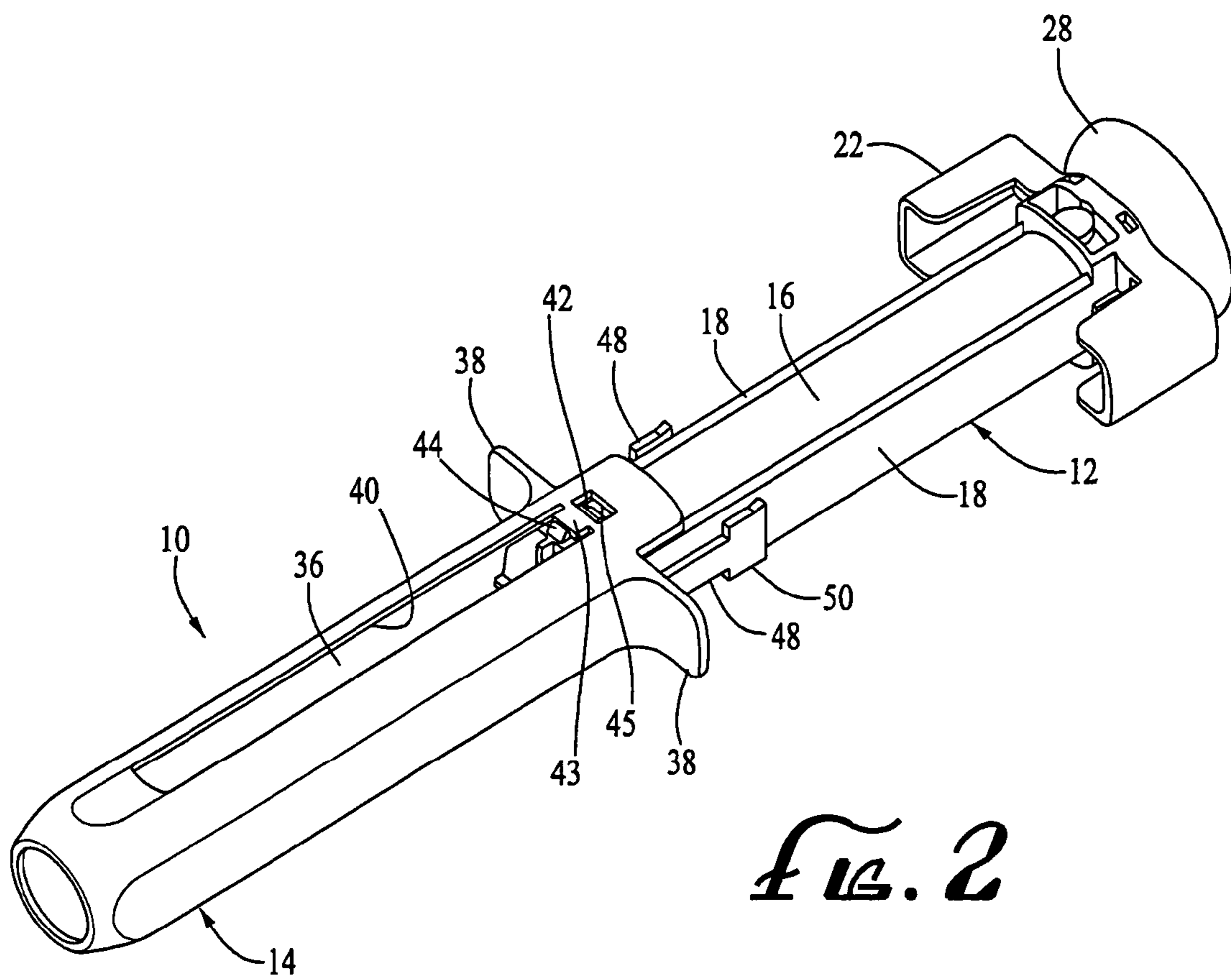


FIG. 2

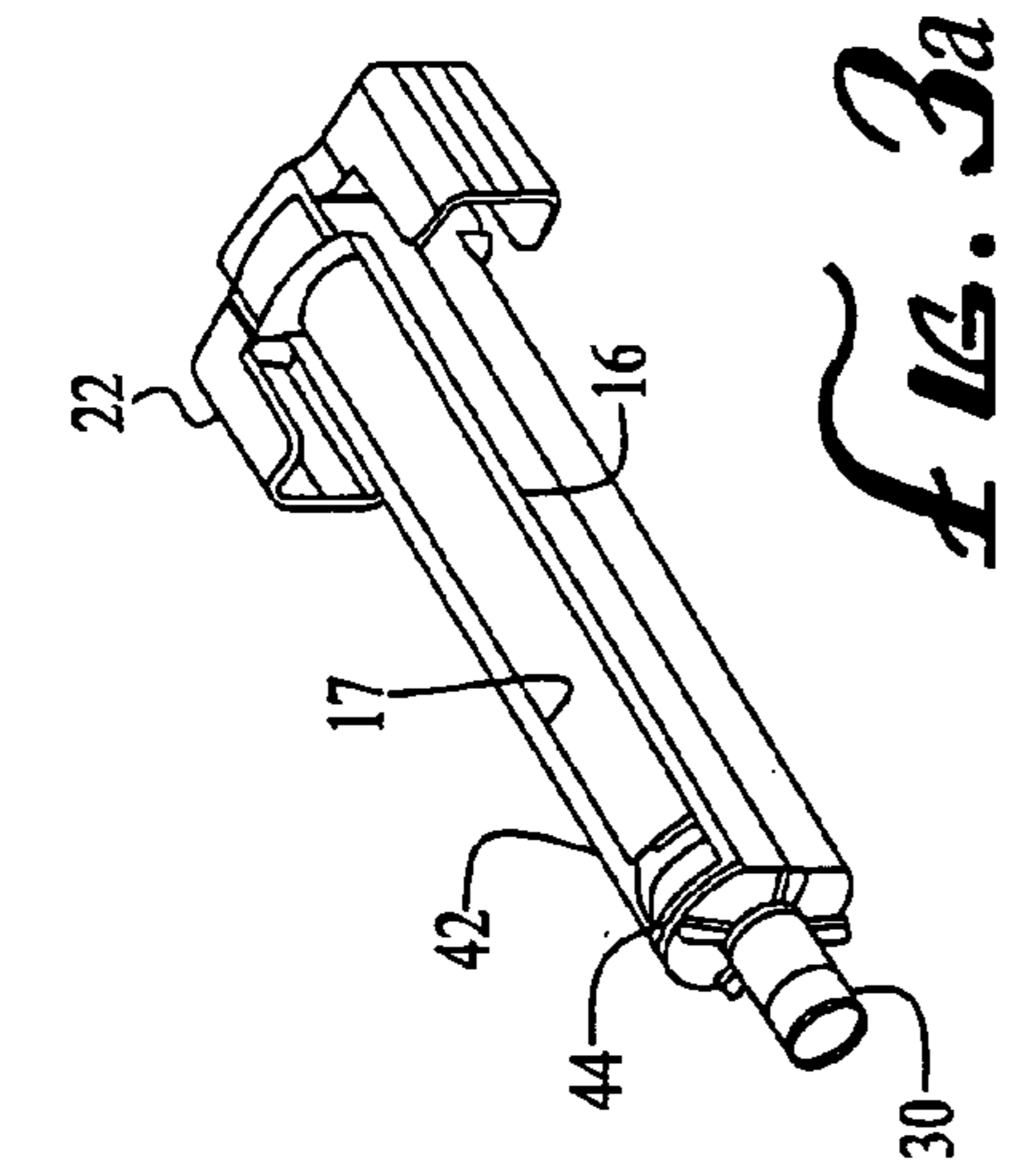


FIG. 3a

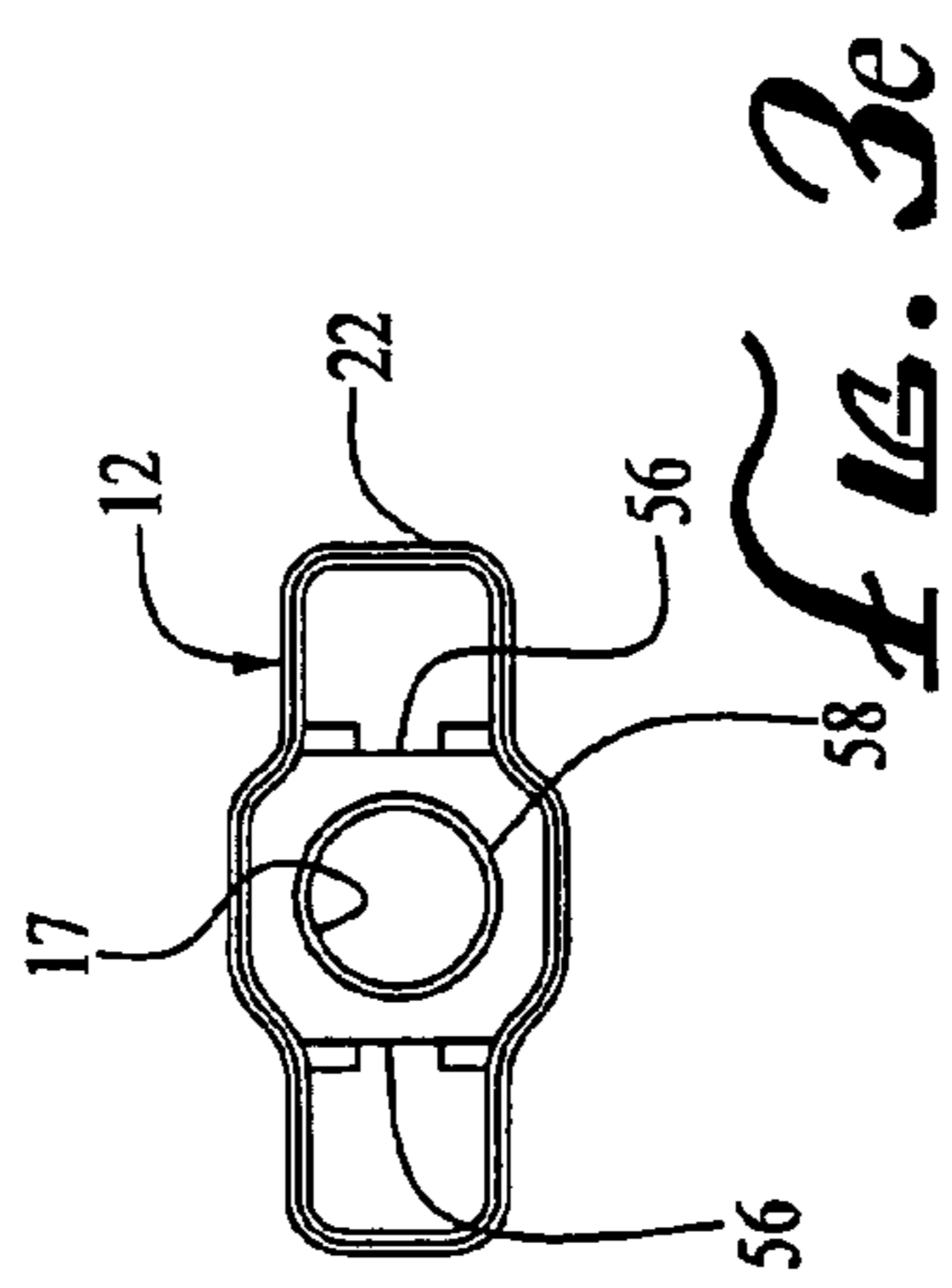


FIG. 3e

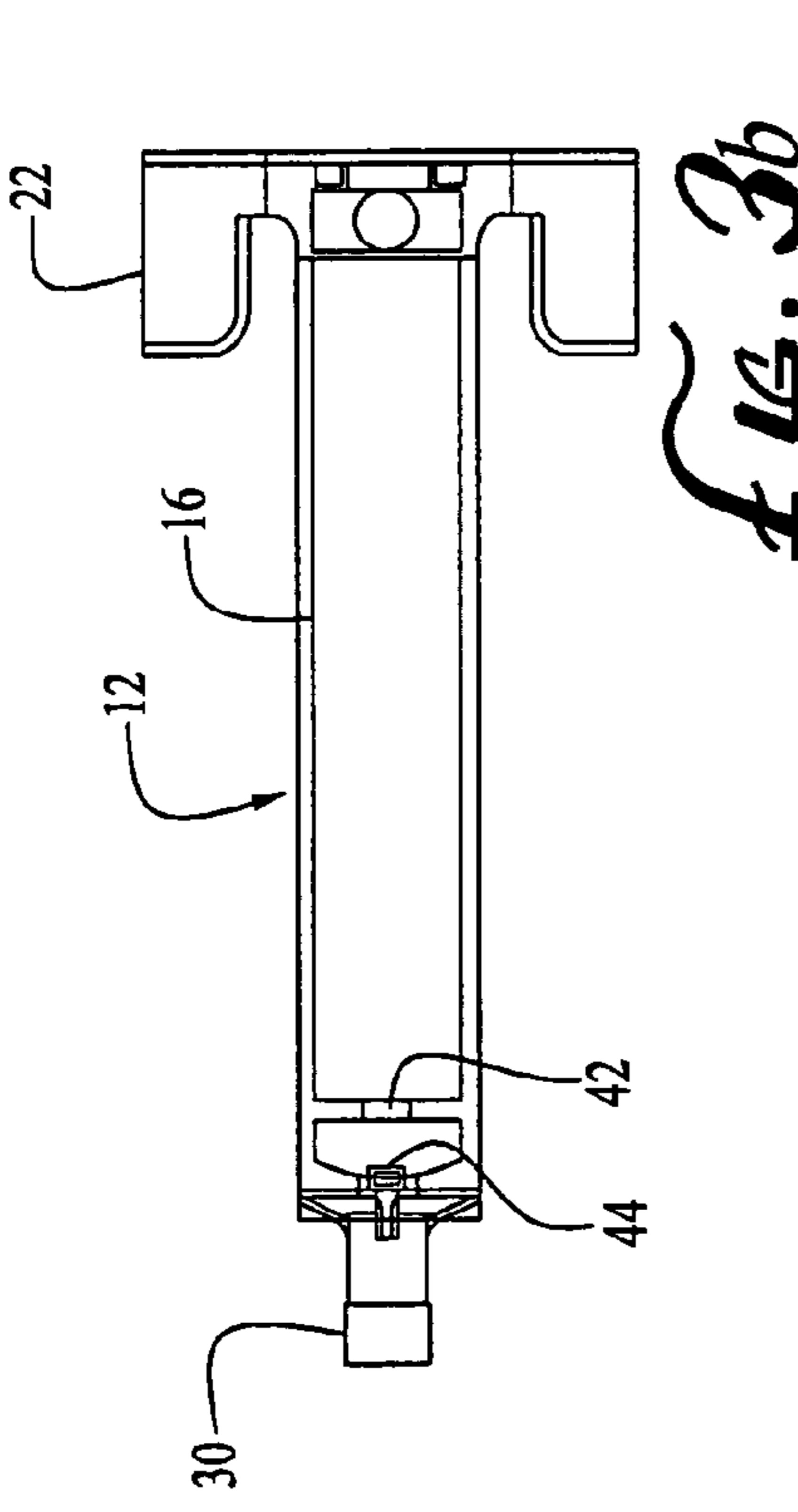


FIG. 3b

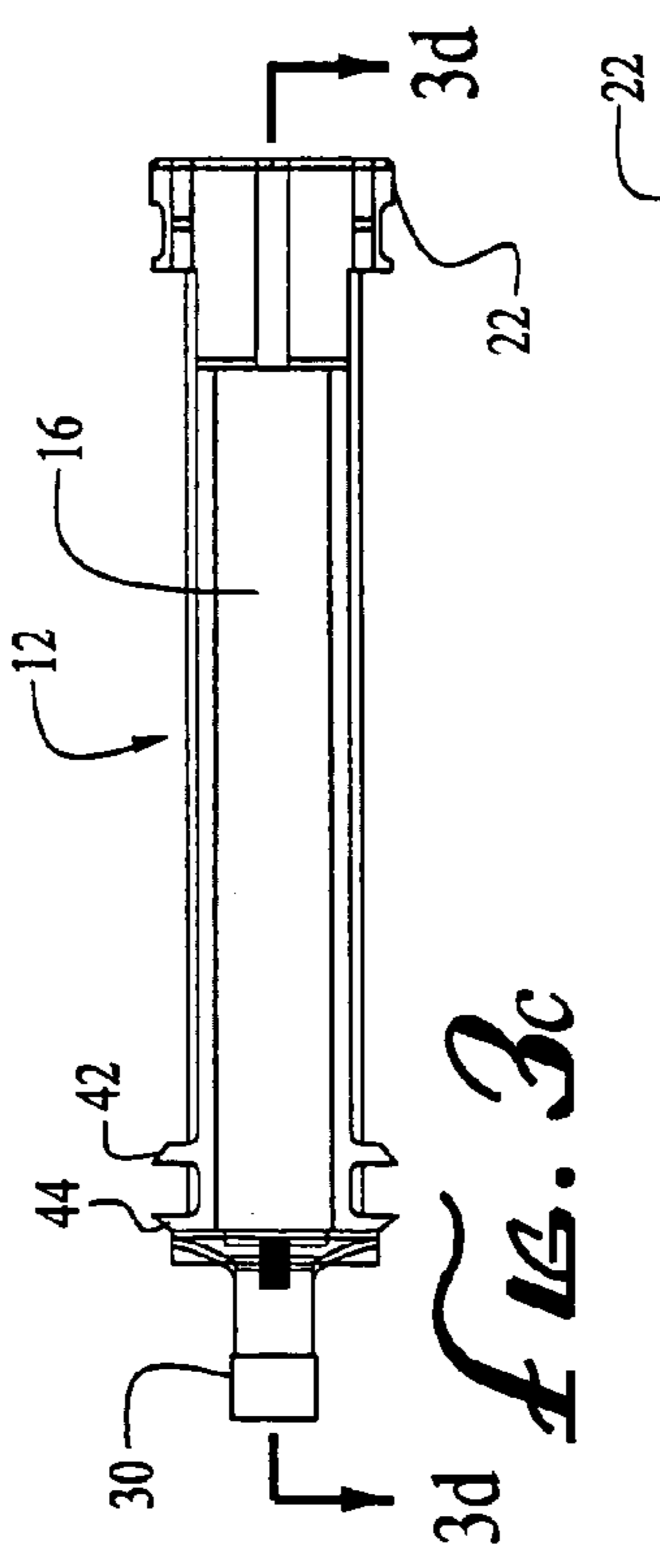


FIG. 3c

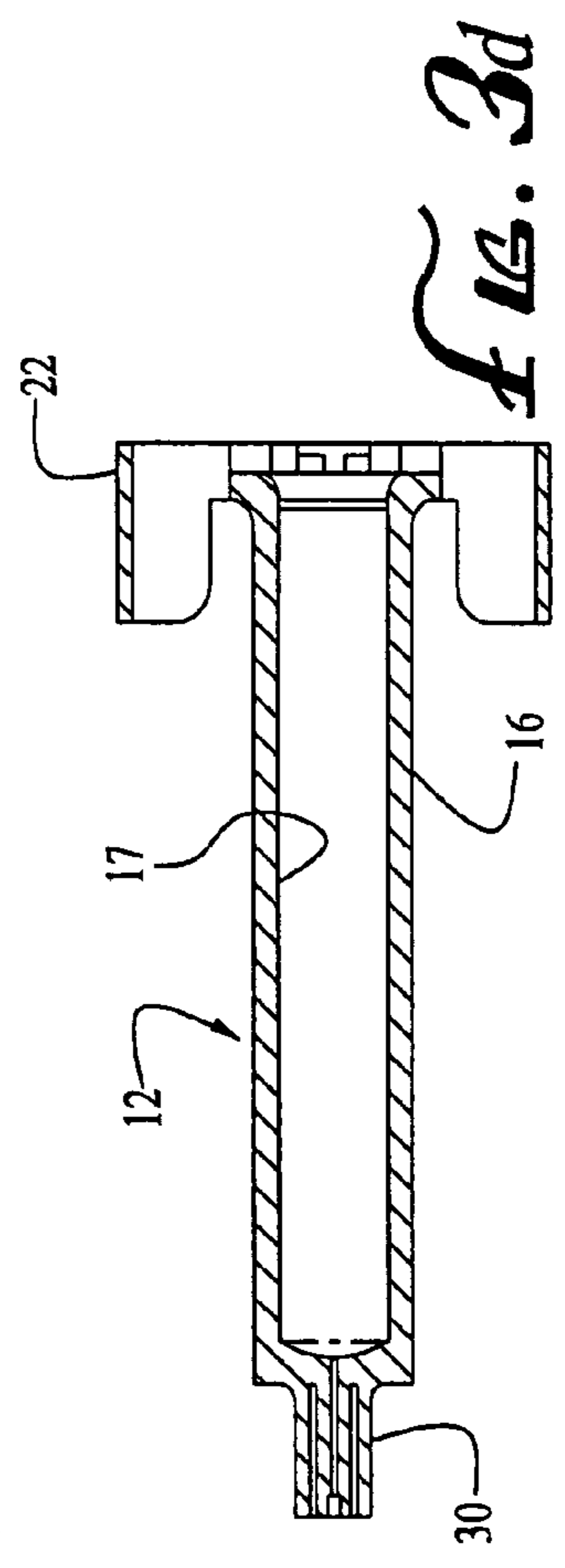
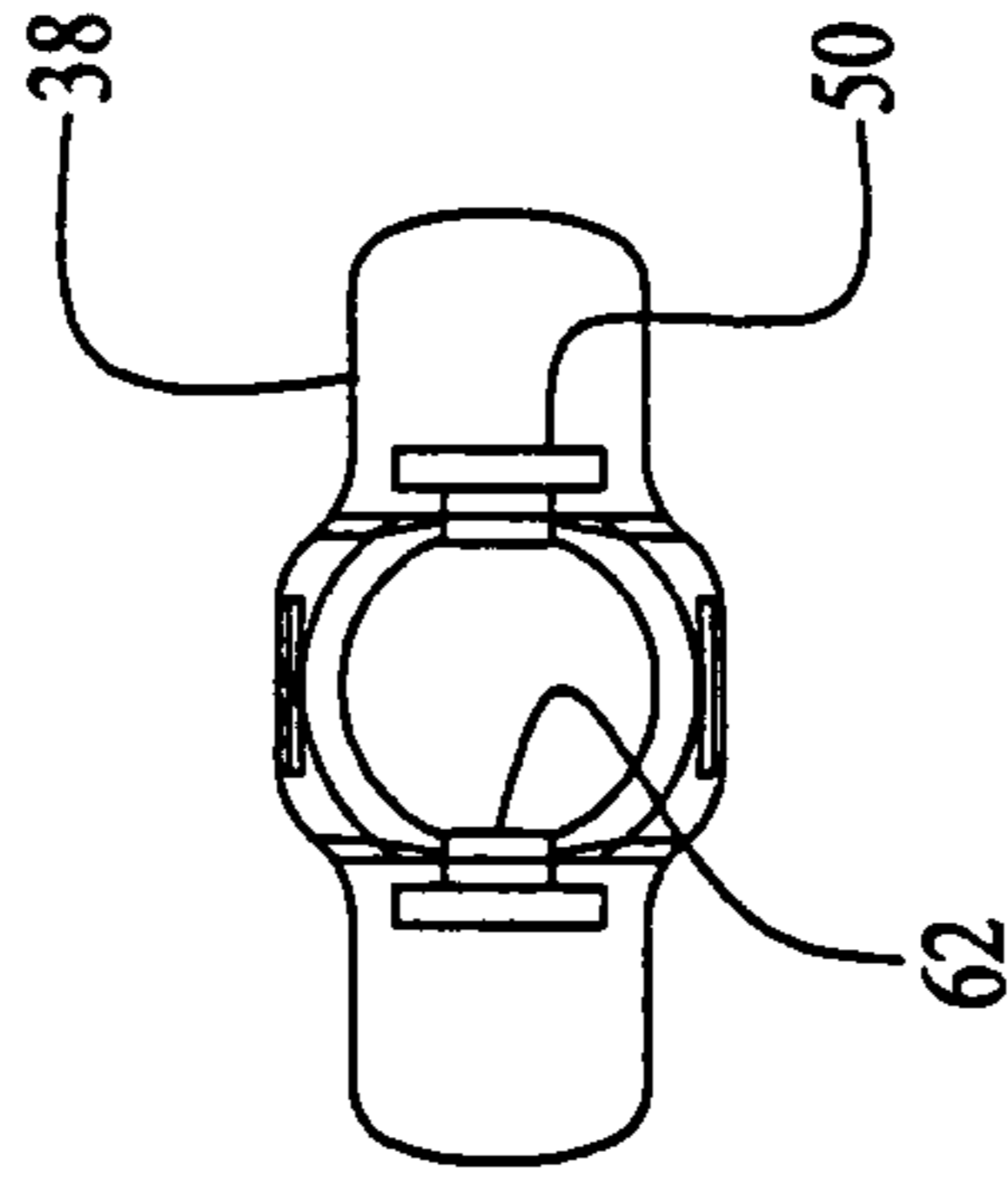
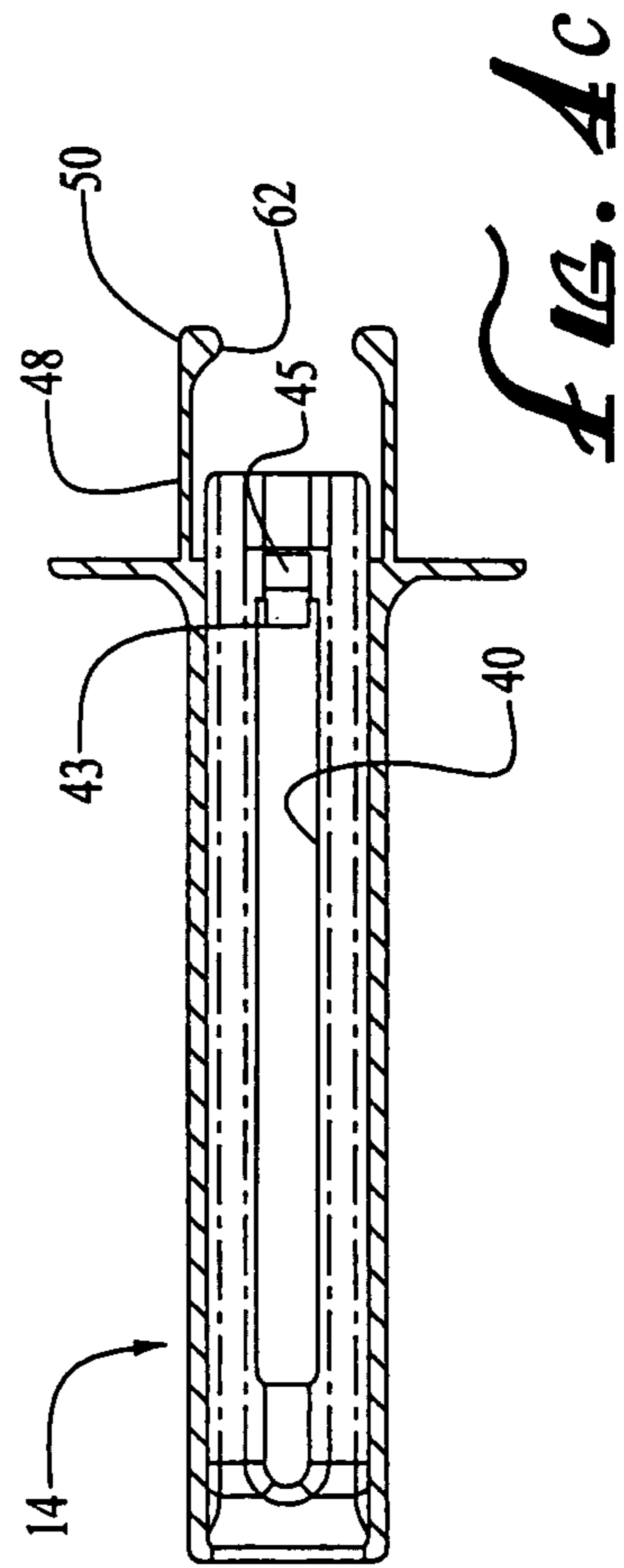
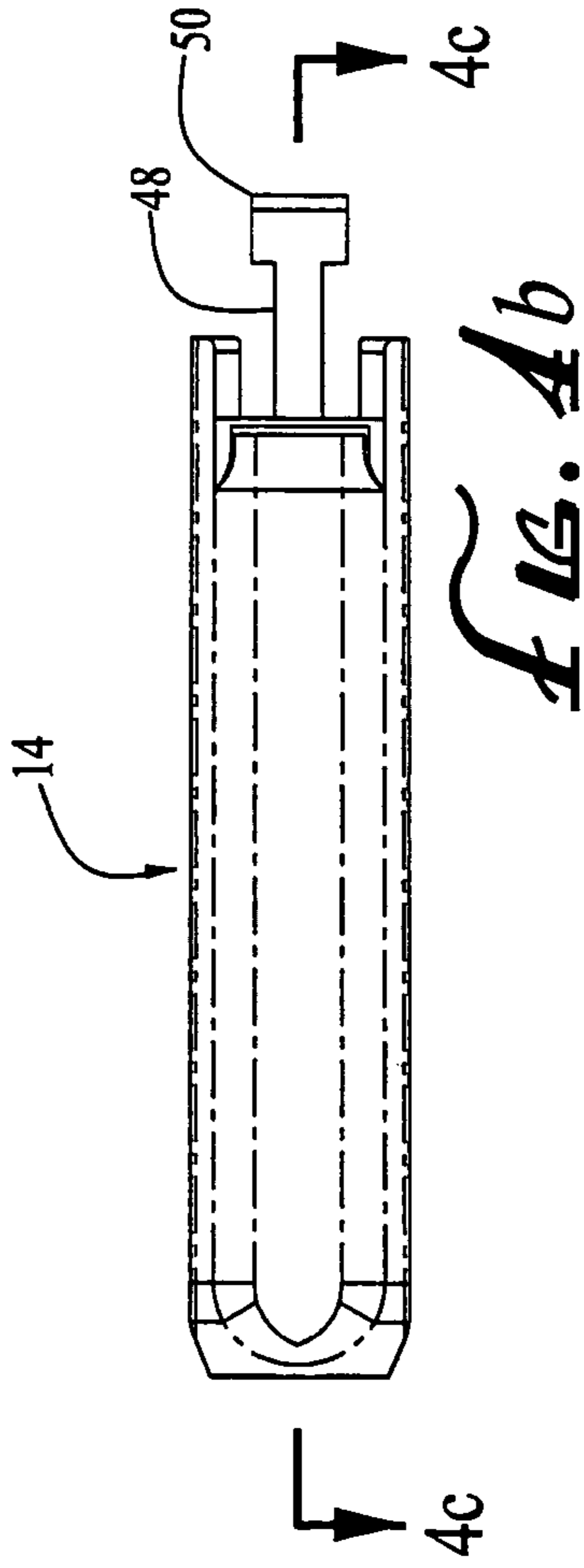
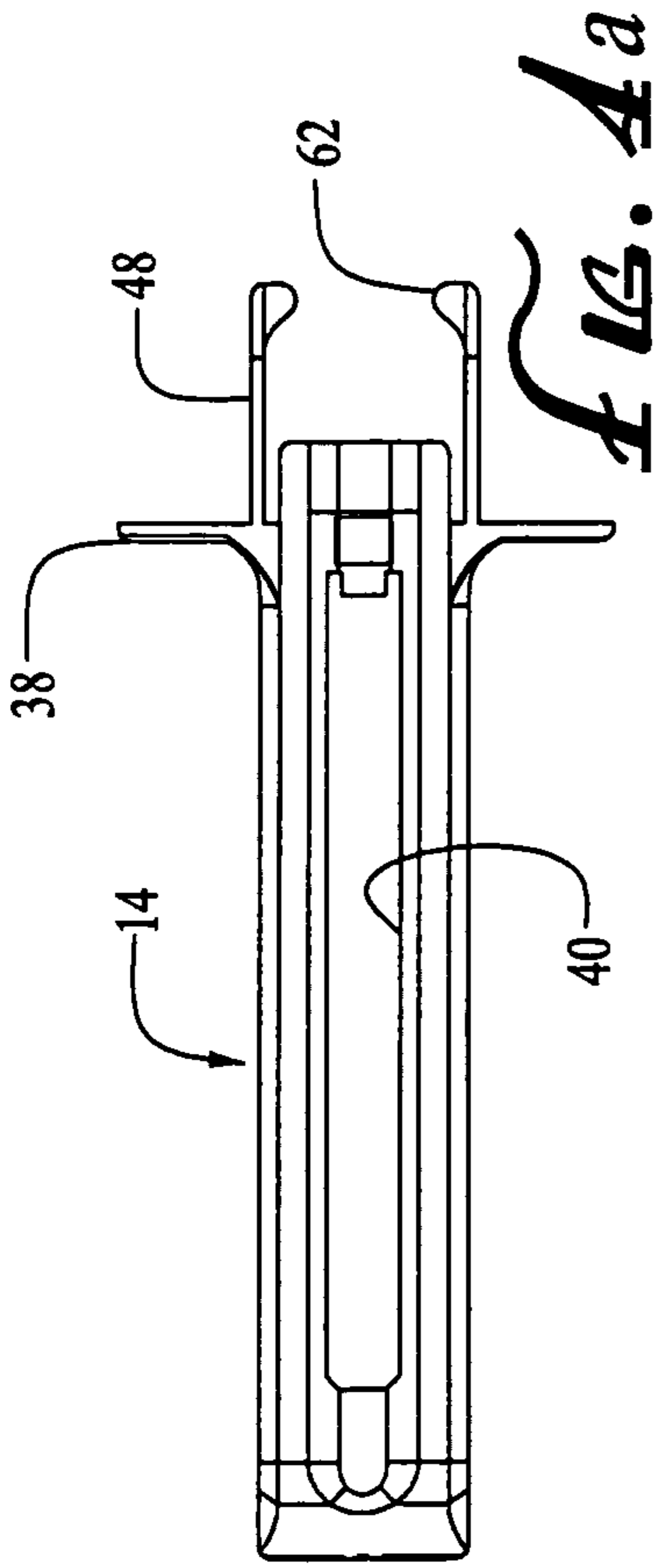


FIG. 3d



1

SYRINGE WITH NEEDLE GUARD INJECTION DEVICE

FIELD OF THE INVENTION

The present invention relates generally to injection devices for administering therapeutic agents to patients, particularly to safety devices for syringes, and more particularly to syringe devices that include a needle guard slidably coupled to a syringe for covering a needle of the syringe after use.

BACKGROUND

Medication is often dispensed using a medicine cartridge, such as a syringe, having a barrel with a needle extending from one end and a plunger slidably inserted into the other end. Such cartridges are often referred to as "pre-filled syringes" because they may contain a specific dosage or volume of medication when they are initially provided, as compared to conventional syringes that are furnished empty and filled by the user before making an injection.

Alternatively, a medicine cartridge may be used, such as an ampoule or vial, that includes a penetrable seal instead of a needle on one end of the barrel, and/or a piston rather than a plunger on the other end. Such medicine cartridges are generally inserted into an adapter that includes a hollow body adapted to hold the cartridge, a plunger to engage and move the piston in the cartridge, and a double-ended needle to penetrate the seal and communicate with the interior of the barrel.

Because of the risk of communicable diseases, a number of syringes and adapters have been developed that are intended to prevent accidental needle sticks and/or inadvertent reuse of a syringe. Retractable needle devices have been suggested for this purpose that include a cartridge that allows a needle of the cartridge to be withdrawn into the barrel after medication is dispensed from it. For example, U.S. Pat. No. 4,973,316 discloses a syringe including a barrel having a needle assembly that is slidably within the barrel between an exposed position such that a needle on the assembly extends from the barrel and a retracted position wherein the needle assembly is withdrawn into the barrel. The needle assembly is initially locked in the exposed position, but may be disengaged upon depression of the plunger, whereupon a spring biases the assembly towards the retracted position, thereby withdrawing the needle into the barrel.

Alternatively, syringe holders have been suggested that include a body within which a conventional syringe or cartridge may be received, and a shield that is manually slidably with respect to the body to cover the needle. For example, U.S. Pat. No. 6,030,366 which is assigned to the assignee of the present application, discloses a self-shielding guard that includes a body having an open proximal end for inserting a syringe into a cavity within the body, and a distal end with an opening through which a needle on the syringe may extend once received in the body. A shield is slidably over the body between retracted and extended positions to expose and cover the needle, respectively. With the shield in the retracted position and the needle exposed, an injection may be made, and then the shield may be manually advanced to the extended position. In the extended position, cooperating detents and detent pockets on the body and shield substantially permanently lock together, thereby preventing reuse of the needle, reducing the risk of accidental needle sticks, and/or facilitating disposal of the syringe.

As an alternative to requiring manual extension of a shield to cover a needle, spring-loaded devices have also been devel-

2

oped. These devices often include a body and slidable shield, similar to the manual devices described above, but also may include a spring element to bias the shield to advance and cover the needle. An actuator, such as a button or lever, may be activated by the user to release the shield, thereby allowing the spring element to advance the shield to cover the needle. For example, U.S. Pat. No. 5,695,475 and U.S. Pat. No. 4,923,447 disclose spring-loaded syringe devices that include inner and outer sliding sleeves that include a button slidable in a longitudinal slot to selectively expose and cover a needle on the devices. A spring in the devices biases one of the sleeves to extend and cover the needle, but this bias may be manually overcome to expose the needle. Thus, these devices may not lock the extending sleeve in a covered position, and therefore may risk accidental needle exposure and/or reuse of the needle. In addition, although these devices are spring-driven, their shields may not extend unless they are manually activated by using a button, and therefore are not truly "passive," but require an affirmative decision by a user to activate their safety feature.

Improved automatic syringe and guard assemblies have been developed comprising a body for receiving a syringe, and a guard or shield slideably disposed on the body, and further including detents for maintaining the shield in a first position in which a needle of the syringe is exposed for use, and in a second position covering the needle after use. A suitable spring is disposed between the body and guard to bias the guard and body to the second position. Several examples are U.S. Pat. Nos. 6,623,459 and 6,613,022.

SUMMARY OF THE INVENTION

The present invention is directed to injection devices incorporating both a syringe, such as a pre-filled syringe, or a medicine cartridge, and a guard that covers a needle of the syringe after a medication in the syringe is injected into a patient. More particularly, the present invention is directed to a syringe design which requires no separate body, and a guard disposed on the syringe, and wherein the syringe and guard are each formed of one piece from plastic. The guard includes one or more latch members forming a detent or detents for retaining the guard in a position on the syringe for exposing a needle of the syringe, and wherein the detent or detents may be released upon predetermined depression of a plunger of the syringe to cause the needle of the syringe to be covered by the guard.

In accordance with one aspect of the present invention, an injection device is provided that includes a syringe having a proximal end, a distal end, and a plunger extending from the proximal end. The injection device also includes a guard having a proximal end, a distal end, and a cavity therebetween. The guard is slidably mounted onto the syringe, and includes a latch member that extends proximally from the guard. A needle may extend from the distal end of the syringe. The guard is biased from a first or retracted position wherein the needle of the syringe is exposed, toward a second or extended position wherein the guard covers the needle. The guard may be biased by a spring element between the syringe and guard, such as located in the distal portion of the guard between the guard and the syringe.

First cooperating detents on the syringe and the guard act to retain the guard in the first position. The first cooperating detents preferably include a ledge on the proximal end of the syringe and a catch on a latch member extending from the guard. Here, the ledge and catch engage one another to retain the guard in the first position. As the plunger is advanced within the syringe, the plunger engages the latch member and

3

releases the first cooperating detents, whereupon the guard slides toward the second position. Second cooperating detents are provided on the syringe and guard to retain the guard in the second position. The second cooperating detents preferably include a detent pocket on the guard and a corresponding tab on the syringe.

More particularly, the syringe comprises a central body having a cylindrical opening for containing medicine and a plunger, and one or more elongated rectangular members or rails disposed on opposite sides of the body and which rails are configured to fit and slide within the guard. The proximal end of the syringe can include suitable gripping surfaces, and the distal end includes a hub to which a needle may be attached such as by threads or a luer lock.

Optionally, the guard may also include a window or slot that extends axially along the guard. When the slot is present on the guard, the syringe may include a stop tab configured to travel within the slot. The stop tab and slot may be configured to limit the proximal and distal movement of the syringe relative to the guard. For example, the stop tab may abut the distal edge of the window when the guard is in the first position to prevent further distal movement of the syringe (or proximal movement of the guard). Similarly, the stop tab may abut the proximal edge of the window when the guard is in the second position to prevent further proximal movement of the syringe (or distal movement of the guard). In addition, the guard may also include a set of finger flanges or grips usable for controlling the movement and speed of advancement or sliding of the guard between the first and second positions with respect to the syringe.

Other advantages and features of the present invention will become apparent from consideration of the following description taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a syringe and guard of the present invention with the guard in a retracted position exposing a needle of the syringe.

FIG. 2 is another perspective view, but illustrating the guard in an extended position with respect to the syringe for covering the needle thereof.

FIG. 3a is a prospective view of the syringe.

FIG. 3b is a top plan view of the syringe.

FIG. 3c is a side elevational view.

FIG. 3d is a cross-sectional view taken along line 3d-3d of FIG. 3c.

FIG. 3e is a proximal end view of the syringe.

FIG. 4a is a top plan view of the guard.

FIG. 4b is a side elevational view.

FIG. 4c is a cross-sectional view taken along a line 4c-4c of FIG. 4b.

FIG. 4d is an enlarged proximal end elevational view.

DETAIL DESCRIPTION

Turning now to the drawings, and first to FIGS. 1 and 2, a syringe and guard assembly 10 is illustrated and comprises a syringe 12 and guard 14. The syringe 12 includes a central body 16 which is a hollow cylinder on the inside and may be cylindrical on the outside as seen in FIG. 2. The syringe 12 includes a pair of longitudinally extending members or rails 18 which are integrally formed on opposite sides of the body 16 as seen in FIG. 2. The proximal end of the syringe 12 includes a gripping member 22. The syringe 12 further includes a conventional plunger 26 with a thumb pad 28. The

4

plunger 26 includes the usual flexible or rubber piston (not shown) on the distal end thereof which slides within the smooth wall interior cylindrical surface of the barrel 16 to dispense medication from the distal end 30 of the syringe 12 through a needle. A needle 31 is attached to the distal end 30. Tab or stop 44 limits distal movement.

The guard 14 is configured to slide between the retracted position shown in FIG. 1 and the extended position shown in FIG. 2, and has elongated rectangular interior sides, only side 36 being seen in FIG. 2, to appropriately mate with the elongated rails 18 of the syringe 12. The guard 14 includes finger grips 38, and preferably includes a window 40 within which a tab 42 from the barrel 16 of the syringe 12 forming a detent may lie. The tab 42 on the syringe limits distal motion of the guard 14 as best seen in FIG. 2. The guard includes a cross-member 43 defining a slot 45. When the guard is in the fully extended position as seen in FIG. 2, the tab 42 of the syringe snaps into the slot 45 to maintain the guard and syringe in the needle protected position seen in FIG. 2.

Reference is now made to the drawings of the syringe and guard in FIGS. 3 and 4. The guard 14 further includes one or more latches 48 having respective flanges or catches 50 forming detents on the proximal end of the guard 14 for engaging cooperating detent surfaces or ledges in the proximal end of the syringe as described below. Turning to FIG. 3e, the proximal end of the syringe 12 is illustrated particularly showing slots 56 on opposite sides of the barrel 16 into which the arms of the latches 48 can rest with the flanges 50 hooked on the rear proximal surface 58 of the proximal end of the syringe 12 when the guard 14 is fully retracted onto the syringe 12 as seen in FIG. 1. The flanges 50 of the latches 48 have inwardly extending fingers 62 (see FIGS. 4a & 4d) which extend further proximally and are engageable by a rounded outer surface of the thumb pad 28 as the plunger approaches its far distal position in dispensing medicine. By the pad 28 engaging the fingers 62, the latches 48 are deflected outwardly, thereby releasing the flanges 50 from the surface 58 and out of the slots 56 to allow the guard 14 to automatically move to the extended position with respect to the syringe as seen in FIG. 2 under the bias of a coil spring which is described below.

Turning more specifically to the syringe FIGS. 3a-3e, the same show the structure of the syringe in more detail, particularly the tab 42, stop 44, and slots 56 which the arms of latches 48 (FIG. 4) hook on as seen in FIGS. 4a and 4d. At the proximal end of the syringe, these slots 56 allow the latches 48 to move inwardly so that the flanges 50 can readily hook on the rear proximal surface 58 of the proximal end of the syringe 12 when the guard 14 is fully retracted onto the syringe as seen in FIG. 1.

After an injection is made, the guard and syringe move, preferably via spring action from a spring (not shown) between the distal ends of the syringe and guard, to the relative positions shown in FIG. 2. The tab 42 locks in the slot 45 to fully lock the guard 14 in the position covering the needle of the syringe. Stop 44 and cross member 43 limit the distal movement.

While the invention is susceptible to various modifications, and alternative forms, specific examples thereof have been shown in the drawings and are herein described in detail. It should be understood, however, that the invention is not to be limited to the particular forms or methods disclosed, but to the contrary, the invention is to cover all modifications, equivalents and alternatives falling within the spirit and scope of the appended claims.

5

What is claimed is:

1. An injection device, comprising:

a plastic syringe comprising a proximal end, a distal end, and a plunger extending from the proximal end, the syringe comprising a body having a hollow cylindrical interior for receiving a medicine and the plunger, and a pair of rectangular longitudinal rails on opposite sides of the body, and a gripping member on the proximal end, the gripping member having slots on opposing sides of the body,

a plastic guard slidably attached to the syringe and having a proximal end and a distal end, the guard being biased from a first position wherein the distal end of the syringe is exposed toward a second position wherein the guard covers the distal end of the syringe, the guard having an interior configuration for mating with the longitudinal rails of the syringe and being slideable thereon,

cooperating detents on the syringe and guard for retaining the guard in the first position and in the second position, the cooperating detents including a first tab and a second tab formed on the body of the syringe adjacent the distal end and axially spaced from one another, a window longitudinally extending along the guard and a slot formed in the guard adjacent the proximal end of the guard in spaced relation with the window, wherein a cross-member defines a distal edge of the slot and a proximal edge of the window, the first tab engages the distal edge of the slot in the guard for limiting proximal motion of the guard when in the second position, the second tab engages a distal edge of the window for limiting proximal motion of the guard when in the first position and engages the proximal edge of the window for limiting distal movement of the guard when in the second position, wherein the cross-member interposes the first and second tabs when the guard is in the second position, and

latch members extending proximally from the guard through the slots in the gripping member and having

6

laterally extending flanges to engage a proximal end of the gripping member, the latch members having inwardly extending rounded fingers at a proximal end that are engageable by a rounded outer cam surface of a thumb pad of the plunger as the plunger is advanced into the syringe for moving the latch members to release the latch members from the gripping member whereupon the guard may slide toward the second position.

2. The device of claim 1, further comprising a spring coupled to the guard and the syringe for biasing the guard toward the second position.

3. The device of claim 1, wherein the first and second tabs are configured to travel within the window.

4. The device of claim 3, wherein the second tab and the proximal edge of the window prevent the guard from advancing distally beyond the second position.

5. The device of claim 3, wherein the second tab and the distal edge of the window prevent the guard from moving proximally beyond the first position.

6. The device of claim 1, wherein the cooperating detents for retaining the guard in the first position comprise a ledge on the proximal end of the syringe and a catch comprising a lateral edge on one of the flanges of the latch members, and wherein the guard is retained in the first position when the catch engages the ledge.

7. The device of claim 6, wherein the fingers of the latch members are located distally from the proximal end of the latch members.

8. The device of claim 1, wherein the cooperating detents comprise the slot on the guard and the first tab on the syringe for preventing the guard from being moved from the second position toward the first position.

9. The device of claim 1, wherein the guard further comprises a set of finger flanges for facilitating controlling movement of the guard from the first position toward the second position.

* * * * *